Pigtailed Analog DFB-LD for CWDM
TBD#xxx Series

■ 1270~1610nm CWDM InGaAsP LD with Optical Isolator

■ SMQW Structure

■ SMF Pigtailed, SC or FC Connector

■ Analog application

Family Model (A ~ H :1470 ~ 1610nm, M ~ W : 1270~1450nm)

TLD#204 / TLD#304

 # - A:1470, B:1490, C:1510, D:1530, E:1550, F:1570, G:1590, H:1610

- M:1270, N:1290, O:1310, P:1330, Q:1350, R:1370, S:1390, T:1410, U:1430 , W:1450

Features

- 1270nm~1610nm, 18 channels InGaAsP SMQW DFB laser diode
- Low threshold, high slope efficiency and high output power LD
- Cost-effective uncooled laser diode
- Operating temperature ; -20℃ to +85℃
- Tested by TERADIAN's Reliability and Qualification Program

Description

The TBD#xxx series, pigtailed coaxial LD module consists of an uncooled, reliable strained MQW InGaAsP laser(DFB) and a back-facet InGaAs PIN photodiode.

The parts of pigtailed LD module – single-mode fiber, lens and laser diode - are actively aligned by high power YAG laser welding method. This packaging guarantees high coupling efficiency, high slope efficiency, low operating current and low tracking error over a wide temperature range.

Applications

- Wireless fiber-optic repeaters
- Analog and digital modulation systems
- Video link

Absolute Maximum Ratings

Parameters	Symbol	Unit	Min.	Max.	Remarks
Ambient Operating Temperature	T_{op}	℃	0 -20	70 85	Indoor Use Extended Temp
Storage Temperature	T_{stg}	℃	-40	85	
Forward Current(LD)	I_{FL}	mA	-	150	
Reverse Voltage(LD)	V_{RL}	V	-	2	
Reverse Current(mPD)	I_{RP}	mA	-	2	
Reverse Voltage(mPD)	V_{RP}	V	-	15	
Lead Soldering Temp./Time		°C/sec		260/10	

Electrical and Optical Characteristics

(T_{op} = 25℃)

Parameters	Symbol	Condition	Unit	Min.	Typ.	Max.	Remarks
Threshold Current	I_{th}	CW	mA		10	15	
Operating Current	I_{op}	CW, @P_f	mA			40	
Forward Voltage	V_f	CW, @P_f	V			1.6	
Optical Output Power	P_f	CW, $I_{op=}$ = I_{th}+20mA	mW		2.0 3.0		TBD#204 TBD#304
Slope Efficiency	η	CW,@P_f	mW/mA	0.08 0.12	0.10 0.15		TBD#204 TBD#304
Thermal Slope Efficiency	Tη	CW, Tη (T)/Tη (25°C) T= -20~+85°C		0.5			
Peak Wavelength	λ_C	CW, @P_f	nm	λ_C ±2nm 1270nm~1610nm, 18ch with 20nm spacing			
Spectral Linewidth	Δλ	CW, @P_f	nm			1	
Side Mode Suppression Ratio	SMSR	CW	dB	30			
Wavelength Temperature Coefficient	–	CW, @P_f	nm/°C	0.07	0.1	0.12	
Tracking Error	γ	APC,T_C=0~+70℃ or -20~+85℃	dB	-1.0		1.0	I_m=const.
Optical Isolation	ISO		dB	30			
Dark Current(m-PD)	I_D	V_{RP}=5V	nA		1	10	
Monitor Current(m-PD)	I_m	V_{RP}=5V, @P_f	mA	0.08			
Capacitance(m-PD)		V_{RP}=5V, f=1MHz	pF			10	

RF Characteristics

(T_{op} = 25℃)

Parameters	Symbol	Condition	Unit	Min.	Typ.	Max.	Remark
Relative Intensity Noise	RIN	CW, @P_f, Freq.=5MHz to 2.3GHz	dB/ Hz			-145	
Modulation Bandwidth[1]	f_{-3dB}	CW, @P_f	GHz	2.6			
RF Bandpass Flatness	BF	Peak to valley, 5MHz to 2.3GHz	dB			1.0	
Second-order Distortion	IMD2	@P_f , Prfin=0dBm/CH, Two-tone test: f1=829MHz, f2=831MHz, f1±f2	dBc			-40	
Third-orderd Distortion	IMD3	@P_f , Prfin=0dBm/CH, Two-tone test: f1=829MHz, f2=831MHz, and also f1=1800MHz, f2=1802.5MHz	dBc			-60	

1. Modulation bandwidth was measured with impedance matched to 50Ω and TO-Can lead 2.0mm-long left after being cut off

! Handling Caution

The LD module can be damaged by overvoltage and current surges. Precautions should be taken for transient power supply.

This device is susceptible to damage as a result of electrostatic discharge(ESD). Take proper precautions during both handling and testing

The stress to the fiber pigtail may cause the damage on the performance. The fiber pigtail may snap off by dropping the module.

Laser Eye Safety

These LD modules have laser semiconductor product and are classified as AEL Class IIIb per U.S. FDA/CDRH 21CFR 1040 and class 3a per EN60825-1. These products comply with 21CFR, Chapter 1, Subchapter J(21CFR 1040.10 and 1040.11 laser safety requirements).

Laser Data

Wavelength : nm(Model :) / nm(Model :)

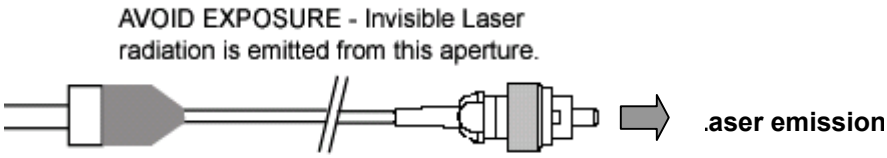
Measured Output power : mW(1310nm) / mW(1550nm)

Limited Power : mW(1310nm) / nW(1550nm)

Caution

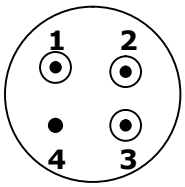
On operation, If optical connectors are unterminated, modules can emit invisible laser radiation. Radiation emitted by laser devices can be dangerous to the eyes. Avoided eye or skin exposure to direct or scattered radiation

Ref : IEC60825

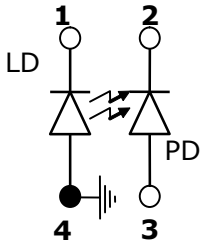


Pin Descriptions

Pin No.	Description(4 pin type)
1	LD cathode
2	Backfacet PD cathode
3	Backfacet PD anode
4	LD anode & Case ground



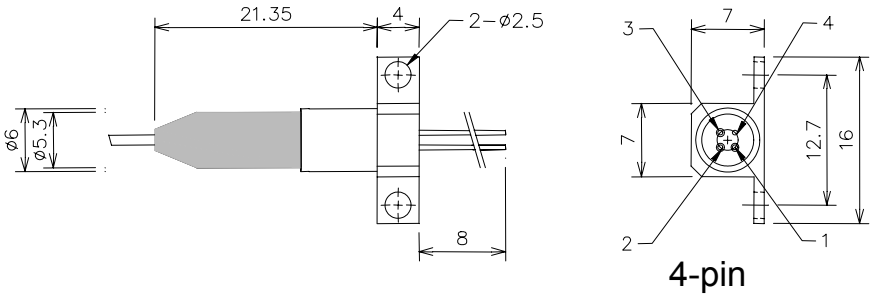
Bottom view



4 pin

Outline Diagram

- TBD#20x-xxxH, TBD#30x-xxxH



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- TBD#20x-xxxV, TBD#30x-xxxV

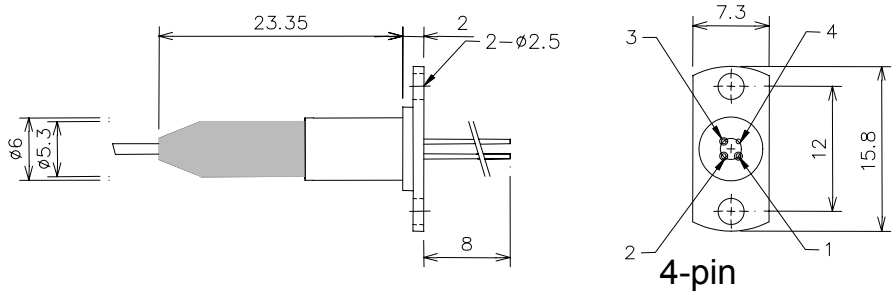

Fig.3 TBD series Dimensions [unit: mm]

Ordering Information

Company	Device Type		Wave-length	Supply Voltage	Pin		Temp. Range	Fiber	Conn-ector	Flange
T	**B**	**D**	**C**	**20**	**4**	**-**	**E**	**S**	**S**	**N**
Teradian	**B**; Analog App. (Wireless Repeater)	**D**;DFB (with isolator)	**A**;1470nm **B**;1490nm **C**;1510nm **D**;1530nm **E**;1550nm **F**;1570nm **G**;1590nm **H**;1610nm **M**; 1270nm **N**; 1290nm **O**; 1310nm **P**; 1330nm **Q**; 1350nm **R**; 1370nm **S**; 1390nm **T**; 1410nm **U**; 1430nm **W**; 1450nm	**20**; 2.0mW **30**; 3.0mW	**4**; 4pin		**I**;Indoor Use (0~70℃) **E**;Extended Temp (-20~85℃))	**S**;SMF	**N**;None **S**;SC **F**;FC **T**;ST **L**;LC	**N**;None **V**;Vertical **H**;Hori-zontal

*Note 1 ; additional order information

- Connector type default is SC/APC and the default length of fiber is 1m

More Information

Teradian Inc.

Address	946, Dunsan-dong, Seo-gu, Daejeon, 302-120, Korea
Tel	+82-42-476-4800, 4803(Oversea Sales Team)
Fax	+82-42-476-4805
Homepage	http://www.teradian.com
e-mail	sales@teradian.com